

Appl. No. 10/649,425  
Reply to Office action of 10/20/2004

### **Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

### **Listing of Claims:**

1. (Currently Amended) A method of forming dual work function metal gate electrodes in a semiconductor device, comprising:  
forming a gate dielectric over a substrate;  
depositing a mold layer having a first opening therein over said gate dielectric;  
[and]  
creating a first metal gate electrode by depositing a first metal in said first opening;  
then, etching said mold layer to form a second opening; and  
depositing a second metal in said second opening to form a second metal gate electrode.

2-5. (Cancelled)

6. (Original) The method as recited in Claim 1, wherein said mold layer is selected from the group consisting of  
a resist material;  
an organic polymer; and  
an inorganic material.

7. (Original) The method as recited in Claim 1, wherein said mold layer is substantially removed after depositing said first and second metal.

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8. (Original) The method as recited in Claim 1, wherein said first metal has a work function between about 4 and about 4.2 eV and said second metal has a work function between about 5 and about 5.2 eV.

9. (Original) The method as recited in Claim 1, wherein said first metal is selected from the group consisting of:

titanium;  
chromium;  
manganese;  
zirconium;  
tantalum;  
tantalum nitride; and  
mixtures thereof.

10. (Original) The method as recited in Claim 1, wherein said first metal is selected from the group consisting of:

cobalt;  
nickel;  
molybdenum;  
ruthenium;  
rhodium;  
palladium;  
rhenium;  
iridium;  
platinum;  
gold; and

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mixtures thereof.

11. (Currently Amended) The method as recited in Claim 12, wherein said creating said first and second metal further includes removing excess first and second metals located above said mold layer.

12. (Original) The method as recited in Claim 11, wherein said removing includes chemical mechanical polishing one or both of said first and second metals.

13. (Original) The method as recited in Claim 11, wherein said removing includes dry etching one or both of said first and second metals.

14. (Original) The method as recited in Claim 1, further including forming source and drain structures that are self-aligned with at least one of said first and second metals.

15-20 (canceled).

21. (new) A method of forming dual work function metal gate electrodes in a semiconductor device, comprising:

forming a gate dielectric over a substrate;

depositing a first mold layer over said gate dielectric;

etching said first mold layer to create a first opening;

creating a first metal gate electrode by depositing a first metal in said first opening;

removing said first mold layer;

forming a second mold layer;

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then, etching said second mold layer to create a second opening; and  
depositing a second metal in said second opening.

22. (new) The method as recited in Claim 21, wherein first and second mold layers have different chemical compositions.

23. (new) The method as recited in Claim 21, wherein said mold layer is selected from the group consisting of

- a resist material;
- an organic polymer; and
- an inorganic material.

24. (New) The method as recited in Claim 21, wherein said first metal has a work function between about 4 and about 4.2 eV and said second metal has a work function between about 5 and about 5.2 eV.

25. (New) The method as recited in Claim 21, wherein said first metal is selected from the group consisting of:

- titanium;
- chromium;
- manganese;
- zirconium;
- tantalum;
- tantalum nitride; and
- mixtures thereof.

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26 (New) The method as recited in Claim 21, wherein said first metal is selected from the group consisting of:

cobalt;  
nickel;  
molybdenum;  
ruthenium;  
rhodium;  
palladium;  
rhenium;  
iridium;  
platinum;  
gold; and  
mixtures thereof.